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**WAIKIKI BEACH NOURISHMENT
A DEMONSTRATION OF OFFSHORE SAND RECYCLING
Kuhio Beach, Waikiki, Hawaii**

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INTRODUCTION

Through tourism, Waikiki has developed into an 'economic engine' for the State of Hawaii. Revenue generated throughout this urban corridor constitutes 44% of the \$11.4 billion originating from annual tourism. The modern beach in Waikiki is largely a product of past engineering efforts. The engineered beach in Waikiki was largely created by placement of natural sands from other inland sources around the state. Despite these efforts, today major segments of the beach have little to no sand at high tide and local resource managers are taking steps to carry out beach nourishment.

PROJECT SCOPE

1. Hydraulically dredge 10,000 yd³ of sediment 2000 feet offshore to 3 designated sites within Kuhio Beach.
2. Barge-mounted submersible pump system using 8" diameter HDPE pipeline mounted to the bottom.
3. Sand slurry (20-40%) pumped at ~100 yd³/hr to a staging area on beach for dewatering and stockpiling.
4. Water quality monitoring daily at 5 stations including weekly bacteria monitoring of the slurry discharge.
5. Approximately \$475k cost (\$47/ yd³). Less expensive than hauling inland sand.
6. Project duration 20-30 days.

CONCLUSIONS

1. The Kuhio beach nourishment project offers an cost-effective opportunity to restore high-value recreational beach to Waikiki Beach.
2. Unique opportunity to demonstrate the value and effectiveness of "recycling" eroded beach sands used in past beach nourishment efforts.
3. Extraction of sand may facilitate ecosystem restoration of the coral reef.
4. Regular dredging of the near-shore sand field in Waikiki may provide a sustainable source of sand for local beach nourishment, restore and enhance reef structure and health and improve near-shore water quality for recreational diving and snorkeling.

In December, 2006 the State of Hawaii, Department of Land and Natural Resources (DLNR) carried out a project to replenish sand at Kuhio Beach, Waikiki with the distribution and of sand pumped onto the beach from offshore sand deposits.

DLNR's contractor American Marine Corporation, a local dredging company, finished pumping the targeted amount of 10,000 cubic yards of sand on December 30, 2006. Despite short delays due to unseasonable high south swells, the dredging project was completed within the expected 20 to 30 day timeframe.

Some heavily eroded sections of beach were restored by adding as much as 50 feet of horizontal width to the eroded reaches that previously had no dry beach. Much of the Kuhio Beach project area was inflated 2-4 feet vertically, providing a dry beach platform to formerly wetted beach area. The project area encompassed approximately 1700 linear feet of beach that extended into three separate project sites.

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